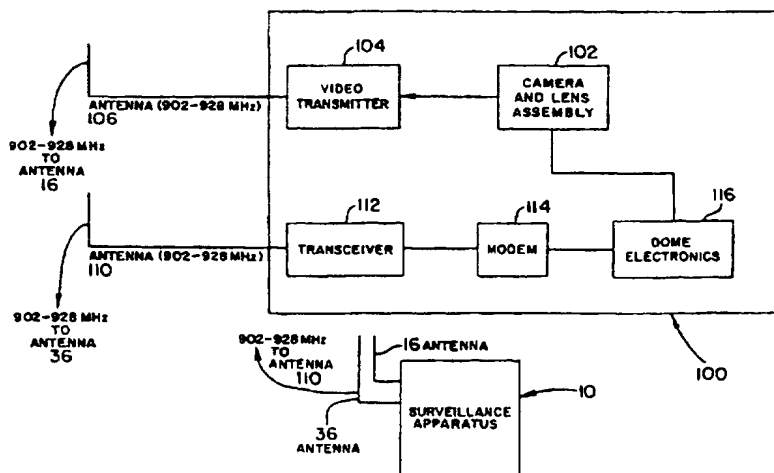




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(54) Title: VIDEO SURVEILLANCE APPARATUS AND SYSTEM



(57) Abstract

A video surveillance apparatus (10) for controlling and receiving information from a video surveillance dome (100) via wireless transmission. The surveillance dome (100) consists of a camera and lens assembly (102), a dome controller (116), a dome transceiver (112), and a dome transmitter (104). The surveillance apparatus (10) comprises a control device for inputting instruction and generating camera adjustment signals, a modem for modulating the camera adjustment signals from the controller, and a display device receiving video signals from the camera and lens assembly (102) via wireless communication transmitted by the dome transmitter (104) for monitoring of a plurality of remote locations relative to the dome and to permit viewing of controlling of the functioning of the camera and lens assembly (102).

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VIDEO SURVEILLANCE APPARATUS AND SYSTEM

Field of the Invention

This invention relates generally to a video surveillance apparatus and pertains more particularly to a wireless video surveillance apparatus for viewing images from a camera and lens assembly in a selected video surveillance device and controlling the functioning thereof.

Background of the Invention

Current video surveillance systems are used for monitoring retail establishments or other large areas, such as casinos, warehouses, etc., for security or crime prevention purposes. These systems generally include one or more video surveillance devices and a video management system.

Each video surveillance device or "dome" consists of a camera and lens assembly housed inside a light transmissive dome-shaped plastic cover and is mounted, for example, to a ceiling of the area being monitored. This particular type of dome is available commercially from Sensormatic Electronics of Deerfield Beach, Florida, under its SpeedDome® trademark and has a camera and lens assembly which can be panned, tilted and zoomed by using a video management system.

A video management system controls the functioning and movement of each camera and lens assembly in each dome through a control panel, which is usually located in a security room. The control panel comprises a plurality of monitors for viewing images from the camera and lens assembly and a controller assembly for controlling the functioning thereof. Through the control panel, security personnel can then view any number of areas through the monitors and can control the functioning and movement of any number of camera and lens assemblies in the domes by using a controller assembly to permit desired viewing coverage of a location under surveillance.

For example, security personnel using the control panel and assembly can view several monitors at a time and can select a view from a particular monitor and change the positioning of the camera and lens assembly in the particular

dome to zoom, focus, pan and tilt to specific locations within the selected area.

However, the present video surveillance systems are hindered by the fact that in order to view or monitor a variety of views from a number of domes, security personnel must be in the security room where the control panel and assembly are located. In addition, if a disturbance occurs in a very large room and security personnel who are present in the room are not near the area being monitored, then those security personnel must rely on information from security room personnel about the disturbance. A delay or transfer of incorrect information to the security personnel on the floor could result in a failed or improper response to the disturbance.

Accordingly, improved video surveillance apparatuses for use with video surveillance systems are being sought to provide another means of monitoring areas as well as the ability to control the functioning of a camera and lens assembly in a particular dome. Specifically, video surveillance apparatuses which are portable and wireless and allow for viewing of an area being monitored by a selected dome as well as permitting control of the functioning of the camera and lens assembly in the selected dome to allow for better viewing, are still being sought.

It is therefore an object of the present invention to provide a video surveillance apparatus which permits viewing images from a camera and lens assembly in a selected surveillance dome as well as controlling the functioning thereof by wireless communication.

It is another object of the present invention to provide a video surveillance apparatus which is portable and compact.

It is an additional object of the present invention to provide a video surveillance device and system which has a small number of components and is economical to manufacture.

Summary of the Invention

In accordance with the principles of the present invention, the above and other objectives are realized in a video surveillance apparatus for controlling and receiving

information from a video surveillance dome including a camera and lens assembly, a dome controller, a dome transceiver and a dome transmitter. The video surveillance apparatus comprises a control device and a display device. The control
5 device comprises a controller for inputting instructions and generating camera adjustment signals in response to the instructions input thereto, a modem for modulating the camera adjustment signals from the controller and for forming modulated signals and a transceiver for transmitting and
10 receiving the signals by wireless communication to and from the dome transceiver for controlling the dome controller to control functioning of the camera and lens assembly. The display device comprises a receiver for receiving video signals from the camera and lens assembly by wireless
15 communication transmitted by the dome transmitter and a television for viewing video images from the video signals generated by the camera and lens assembly to permit monitoring of a plurality of remote locations relative to the dome and to permit viewing of controlling of the functioning
20 of the camera and lens assembly.

The video surveillance apparatus in a further embodiment can be used with a video management system to control a plurality of video surveillance domes from one location.

Brief Description of the Drawings

25 The above and other features and aspects of the present invention will become more apparent upon reading the following detailed description in conjunction with the accompanying drawings, in which:

FIG. 1 is a block diagram of the video surveillance
30 apparatus in accordance with the principles of the present invention;

FIG. 2 is a block diagram of the surveillance dome and the video surveillance apparatus of FIG. 1;

FIG. 3 is a block diagram of a video link between the
35 surveillance dome and video surveillance apparatus of FIG. 2;

FIG. 4 is a block diagram of modem communication for the video surveillance apparatus of FIG. 1; and

FIG. 5 is a block diagram of the video management system

and the video surveillance apparatus of FIG. 1.

Detailed Description

FIG. 1 shows a video surveillance apparatus 10 in accordance with principles of the present invention. In the present illustrative case, it is assumed that the video surveillance apparatus 10 is to be used in a video surveillance system to permit monitoring of images from camera and lens assemblies in selected video surveillance domes, such as a SpeedDome®, commercially available from Sensormatic Electronics of Deerfield Beach, Florida, to control functioning of a camera and lens assembly inside the selected dome.

More particularly, the video surveillance apparatus 10 is a handheld portable RF (radio frequency) device which allows security personnel who are within a short range from a particular dome to access and view images from the camera and lens assembly therein by wireless communication. The video surveillance apparatus 10 also allows security personnel to control the functioning of the camera and lens assembly in the selected dome (i.e., zooming, focusing, panning, tilting and iris control) by wireless communication to permit better viewing of the selected area.

Further, security personnel can carry the video surveillance apparatus 10 from one place to another, select a particular dome from which viewing is desired, and control and monitor the camera and lens assembly inside that selected dome by using the apparatus 10. Because of the portability and wireless communication ability of the apparatus 10, security personnel can monitor and control any dome from a variety of remote locations relative to the selected dome. Further, the apparatus 10 can be carried by security personnel while moving between locations while at the same time monitoring and controlling the functioning of the camera and lens assembly.

As shown in FIG. 1, the surveillance apparatus 10 comprises display means in the form of viewing means or a mini-LCD portable television 12 for viewing video images from video signals originating in a camera and lens assembly 102

in a surveillance dome 100 (shown in FIG. 2), receiving means or a wireless RF apparatus video receiver 14 with an antenna 16 for receiving the video signals from the camera and lens assembly 102, and control means which comprises inputting means in the form of an apparatus controller 30 for inputting instructions and generating camera adjustment signals in response to the instruction input to the controller 30 to control the functioning of the camera and lens assembly 102. The surveillance apparatus 10 also comprises transmitting means or a modem 32 and an apparatus transceiver 34 with an antenna 36 for sending out the commands from the controller 30 to control the functioning of the camera and lens assembly 102 in the surveillance dome 100 and for receiving response signals from the dome in response to the transmitted camera adjustment signals. A battery 40 provides the power source for the surveillance apparatus 10 thereby enhancing the portability of the apparatus 10.

The antenna 16 receives from the surveillance dome 100 RF video signals within a first channel of the radio frequency range of 902 to 928 MHz (in the present illustrative case, the first channel is the Industrial Scientific Medical (ISM) channel). This allows the images from a selected dome to be shown on the LCD screen 18 (shown in FIG. 3) of the television 12. The television 12 used can be a commercially available television sold by Radio Shack, Inc., under the name Pocket Vision 31®. The antenna 36, extending from the transceiver 34, sends and receives RF control signals within a second channel of the radio frequency range of 902 to 928 MHz to control zooming, focusing, panning and tilting of the camera and lens assembly 102 in the surveillance dome 100.

With reference to both FIGS. 1 and 2, the surveillance apparatus 10 through its antenna 36 can transmit and receive signals to control the functioning of the camera and lens assembly 102 and through its antenna 16 can receive signals to view the video images from the camera and lens assembly 102 in the dome 100.

The camera and lens assembly 102 sends video signals of

video images of a particular area to a dome video transmitter 104. The dome video transmitter 104 then sends the signals through an antenna 106 in the first channel of the radio frequency range of 902 to 928 MHz so that the signals can be
5 received by the receiving antenna 16 of the surveillance apparatus 10. The first channel of the radio frequency range 902 to 928 MHz is separate from the second channel of this frequency range in which the apparatus 10 operates to control the functioning of the camera and lens assembly 102. The
10 video images received at the apparatus 10 are fed to and displayed on the LCD screen 18 of the television 12. The video transmission between the video surveillance apparatus 10 and video surveillance dome 100 will be explained in greater detail below.

15 The surveillance apparatus 10 is also able to control the functioning of the camera and lens assembly 102 through the controller 30 by sending control signals to and receiving signals from the surveillance dome 100. Instructions for changing the zooming, panning, etc., of the camera and lens
20 assembly 102 are input to the controller 30 and the controller 30 then generates camera adjustment signals in response thereto. The modem 32 then modulates the camera adjustment signals and sends the modulated signals to the transceiver 34. The transceiver 34 transmits the modulated
25 signals in the second channel of the radio frequency range of 902 to 928 MHz. In the present illustrative case, the modem 32 and transceiver 34 are commercially available as a unit from Communications Research & Development Corporation located in Indianapolis, Indiana under the name Comrad®.

30 The dome antenna 110 receives the signals in the second channel of the radio frequency range from the antenna 36 of the surveillance apparatus 10 and then sends the signals to dome transceiving means or a dome transceiver 112 and dome modem 114. In the present illustrative case, the dome
35 transceiver 112 and dome modem 114 are commercially available as a unit from Communications Research & Development Corporation located in Indianapolis, Indiana under the name Comrad®. The signals are then sent to the dome controller or

electronics 116 which circuitry controls the panning, zooming, tilting, focusing functions of the camera and lens assembly 102 and response signals by the dome transceiver 112 can then be sent back for handshaking with the apparatus 10.

5 The controller 30 of the video surveillance apparatus 10 is preferably a TouchTracker® controller, commercially available from Sensormatic Electronics of Deerfield Beach, Florida. Although not illustrated, the TouchTracker® controller has zoom, focus and iris control buttons, a
10 tracker ball which permits panning and tilting of a camera and lens assembly and a programmable key pad assembly. Accordingly, control signals for each specific function controllable by the controller 30 can be sent through the modem 32 and transceiver 34 to control the camera and lens
15 assembly 102 in the dome 100 by wireless communication.

 The transferring of the video information or video link between the selected dome 100 and the surveillance apparatus 10 is shown in greater detail in FIG. 3. A video signal from the camera and lens assembly 102 is sent to a video modulator
20 120 where the video signal is translated to the first RF channel in the frequency range of 902 to 928 MHz. The signal is then sent to a RF amplifier 122 which amplifies the signal for transmission out through the antenna 106. The antenna 16 on the RF receiver 14 then picks up the signal from the RF
25 amplifier 122 which with respect to FIG. 3, for example, is transmitted at 915 MHz. This particular radio frequency at which the antenna 16 receives the signal from the camera and lens assembly 102 of the dome 100 is dependent on the channel selection for the television, which in this case, is set to
30 receive at channel 3 or 4. A local oscillator 124 provides a beat signal for a down conversion to channel 3 or 4 for input to the television 12. A mixer 126 mixes the signal from the RF receiver 14 and the beat signal from the local oscillator 124 and converts the signal to channel 3 or 4
35 depending upon the channel selection of the television 12. The video image from the selected surveillance dome is then displayed on the LCD screen 18 of the television 12.

 The operation of the modem 32 and transceiver 34 in

video surveillance apparatus 10 to send control signals to the camera and lens assembly 102 in the selected dome 100 for controlling the functioning thereof by the video surveillance apparatus 10 is shown in greater detail in the Modem Block
5 Diagram of FIG. 4.

Tx Data 150 from the apparatus controller 30 is sent to an interface 152 which provides circuitry for connection to a digital to analog converter 154. The converter 154 converts the signal and sends the signal to a RF modulator
10 156 which converts the signal to an RF signal. An RF amplifier 158 increases the RF amplitude for transmission. A transmit/receiver (T/R) switch 160 controls the signal flow to and from the antenna 36 depending upon whether the signals are being transmitted or received. In the present case of
15 transmitting signals from the controller 30, the T/R switch couples to the amplifier 158 so that the generated signals are fed to the antenna 36.

When the modem 32 and transceiver 34 are receiving signals, the T/R switch 160 couples to a receiver/filter 188
20 which receives the incoming signal. A RF demodulator 186 demodulates the signal and sends the signal to an analog to digital converter 184. An interface 182 provides circuitry for connection between the analog to digital converter 184 and the Rx data 180. A timing circuit 190 controls the
25 timing for the interfaces 152 and 182 and power for the circuitry can be supplied by the battery 40 powering the controller 30.

The Modem Block Diagram of FIG. 4 can also be similarly applied to the operation of the modem 114 in the surveillance
30 dome 100 for receiving and transmitting the control signals in connection with control of the camera and lens assembly 102.

The present video surveillance apparatus 10 has a range of approximately 100-150 feet from the selected video
35 surveillance dome 100 for receiving video signals and 300-600 feet for transmitting and receiving the camera adjustment signals to the dome 100. Both ranges, however, can be increased or decreased depending upon the needs of security

personnel. For example to increase the range of the apparatus 10, the sizes of the antennas of the apparatus 10 and the dome 100 can be increased or video transmitters can be installed at varying increments for controlling a number of domes, for example, to increase the video signal range of the apparatus. In addition, the radio frequency ranges of the apparatus 10 and dome 100 are not fixed but can operate in a variety of channels.

The video surveillance apparatus 10 of the present invention is not limited to viewing images and controlling an individual dome but can also be used through a video management system 200, as shown in FIG. 5, to control one or a plurality of domes in a similar manner as previously discussed.

The video management system 200 controls multiple surveillance domes by means of a control panel and controller (not shown). The video management system 200 has an antenna 202 for transmitting video signals from a video management video transmitter 204. The video signals are coupled through a video management video controller 208 which controls a video management video switcher 206 so as to pass selected video signals from one of three domes 210, 212 or 214, each having a camera and lens assembly and a dome controller therein. The video signals transmitted by the antenna 202 are received by the antenna 16 on the surveillance apparatus 10 and coupled to the LCD screen 18 of the television 12 in a first channel of a radio frequency range of 902 to 928 MHz.

The surveillance apparatus 10 can also send and receive signals for controlling the dome electronics in a selected dome through antenna 220 of the video management system 200. A video management transceiving means or video management transceiver 222 and video management modem 224 receive signals from the apparatus 10 and send the signals to a video management processor controller 226. The controller 226 couples the signals to a video management switcher 228 to control the switching action thereof so as to pass selected control signals to one of three domes 210, 212 and 214. Then depending upon the dome selected, the selected dome

controller therein then controls the corresponding camera and lens assembly.

Based upon the foregoing, security personnel can view images and control the functioning of a camera and lens assembly from a selected individual dome within a short range from the dome by using the wireless portable video surveillance apparatus 10 of the present invention without having to be actually present or having to rely on information from personnel in a security room. In addition, the wireless portable video surveillance apparatus 10 allows security personnel the ability to control a video management system 200, to access any number of different domes through the management system 200 and to monitor and control a selected dome 100 from any number of domes.

The present invention is not limited to the controller 30 of the above embodiment but can comprise a joystick or knob arrangement, touch screen technology or other means which can control the functioning of the camera and lens assembly in a dome. Further, more than one battery can be used in the surveillance apparatus 10 and any type of battery or portable power supply can be used to power the surveillance apparatus 10.

Additional components can be added to the video surveillance apparatus 10 to assist in its monitoring and controlling functions. For example, an audio component can be added to the apparatus 10 as well as the dome 100 to provide audio as well as visual monitoring of a selected location. Components which indicate the occurrence of a dome alarm can also be incorporated into the apparatus 10 and located on the dome 100 to provide further monitoring. A dome alarm can be triggered by, for example, a door switch sensor, heat sensor, a motion detector and smoke and carbon monoxide detectors.

In all cases it is understood that the above-described arrangements are merely illustrative of the many possible specific embodiments which represent applications of the present invention. Numerous and varied other arrangements, can be readily devised in accordance with the principles of

the present invention without departing from the spirit and scope of the invention.

What Is Claimed Is:

1. A video surveillance apparatus for controlling and receiving information from a video surveillance dome including a camera and lens assembly for generating video signals, a dome transceiver for transmitting and receiving signals to and from the video surveillance apparatus, a dome controller for receiving signals from the dome transceiver for controlling functioning of the camera and lens assembly, and a dome transmitter for transmitting video signals from the camera and lens assembly, said video surveillance apparatus comprising:

a. control means comprising:

(i) means for inputting instructions and generating camera adjustment signals in response to the instructions input thereto;

(ii) transmitting means for transmitting the generated camera adjustment signals by wireless communication to the dome transceiver to control the dome controller to control the functioning of the camera and lens assembly; and

b. display means comprising:

(i) means for receiving video signals from the camera and lens assembly by wireless communication transmitted by the dome transmitter; and

(ii) means for viewing video images from the video signals generated by the camera and lens assembly to permit monitoring of a plurality of remote locations relative to the dome and to permit viewing of controlling of the functioning of the camera and lens assembly.

2. An apparatus in accordance with claim 1, wherein:

said inputting means comprises an apparatus controller for inputting the instructions and generating the camera adjustment signals for controlling the functioning of the camera and lens assembly, the functioning of the camera and lens assembly including panning and tilting, focusing, zooming and iris controlling of the camera and lens assembly,

said transmitting means comprises:

a modem for modulating the generated camera adjustment signals from the apparatus controller and for

forming modulated signals, and

an apparatus transceiver for transmitting the modulated signals by wireless communication to the dome transceiver for controlling the dome controller to control the functioning of the camera and lens assembly and for receiving response signals from the dome transceiver in response to the transmitted modulated signals,

said receiving means comprises an apparatus receiver for receiving the video signals from the camera and lens assembly by wireless communication transmitted by the dome transmitter, and

said viewing means comprises a television for viewing the video images from the video signals generated by the camera and lens assembly.

3. An apparatus in accordance with claim 2, wherein the video signals sent by said dome transmitter and received by said apparatus receiver are in a first channel of a radio frequency range and the signals sent by said apparatus transceiver and received by said dome transceiver and the response signals sent by said dome transceiver and received by said apparatus transceiver are in a second channel of the radio frequency range.

4. An apparatus in accordance with claim 3, wherein said first channel is a channel within the radio frequency range 902 to 928 MHz and said second channel is a channel within the radio frequency range 902 to 928 MHz.

5. The apparatus in accordance with claim 1, wherein said video surveillance apparatus is a hand-held portable apparatus.

6. A video surveillance system comprising:

a. video surveillance apparatus comprising:

(i) apparatus control means comprising:
means for inputting instructions and generating camera adjustment signals in response to the instructions input thereto; and

apparatus transmitting means for transmitting the generated camera adjustment signals by wireless communication; and

- (ii) display means comprising:
apparatus receiving means for receiving
video signals by wireless communication;
means for viewing video images from the
5 received video signals; and
- b. a video surveillance dome comprising:
- (i) a camera and lens assembly for producing
the video images and generating the video signals from the
video images;
- 10 (ii) a dome controller connected to the camera
and lens assembly for controlling functioning of the camera
and lens assembly;
- (iii) dome transceiving means for receiving
the generated camera adjustment signals from the apparatus
15 transmitting means and for providing the received signals to
the dome controller to control the dome controller to control
the functioning of the camera and lens assembly;
- (iv) a dome transmitter for transmitting the
video signals generated by the camera and lens assembly to
20 the apparatus receiving means to permit monitoring of a
plurality of remote locations relative to the dome and to
permit viewing of controlling of the functioning of the
camera and lens assembly by the viewing means of the
apparatus.
- 25 7. A video surveillance system in accordance with
claim 6, wherein:
- said inputting means comprises an apparatus controller
for inputting the instructions and generating the camera
adjustment signals for controlling the functioning of the
30 camera and lens assembly, the functioning of the camera and
lens assembly including panning and tilting, focusing,
zooming and iris controlling of the camera and lens assembly,
- said transmitting means comprises:
- a modem for modulating the generated camera
35 adjustment signals from the apparatus controller and for
forming modulated signals, and
- an apparatus transceiver for transmitting the
modulated signals by wireless communication to the dome

transceiver for controlling the dome controller to control the functioning of the camera and lens assembly and for receiving response signals from the dome transceiver responsive to the transmitted modulated signals,

5 said receiving means comprises an apparatus receiver for receiving the video signals from the camera and lens assembly by wireless communication transmitted by the dome transmitter,

10 said viewing means comprises a television for viewing the video images from the video signals generated by the camera and lens assembly, and

 said dome transceiving means comprising:

15 a dome transceiver for receiving the modulated signals from the apparatus transceiver by wireless communication and sending the response signals back to the apparatus transceiver in response to the received modulated signals from the apparatus transceiver, and

20 a modem for demodulating the received modulated signals from the dome transceiver and sending the demodulated signals to the dome controller for controlling the functioning of the camera and lens assembly.

8. A video surveillance system in accordance with claim 7, wherein the video signals sent by said dome transmitter and received by said apparatus receiver are in a first channel of a radio frequency range and the signals sent by said apparatus transceiver and received by said dome transceiver and the response signals sent by said dome transceiver and received by said apparatus transceiver are in a second channel of said radio frequency range.

30 9. A video surveillance system in accordance with claim 8, wherein said first channel is a channel within the radio frequency range 902 to 928 MHz and said second channel is a channel within the radio frequency range 902 to 928 MHz.

10. A video surveillance system comprising:

35 a. video surveillance apparatus comprising:

 (i) apparatus control means comprising:

 means for inputting instructions and generating camera adjustment signals in response to the

instructions input thereto;

apparatus transmitting means for transmitting the generated camera adjustment signals by wireless communication; and

5 (ii) display means comprising:

apparatus receiving means for receiving video signals by wireless communication;

means for viewing video images from the received video signals;

10 b. a plurality of video surveillance domes, each dome comprising a camera and lens assembly for producing video images and generating video signals from the video images and a dome controller connected to the camera and lens assembly for controlling functioning of the camera and lens
15 assembly; and

c. a video management system comprising:

(i) video management transceiving means for receiving the generated camera adjustment signals from the apparatus transmitting means;

20 (ii) a video management controller for receiving the generated camera adjustment signals from the video management transceiving means and for controlling sending of the signals to a selected dome;

(iii) a video management switcher for
25 switching between the plurality of domes and sending the signals from the video management controller to the selected dome to control a dome controller of the selected dome for controlling functioning of a camera and lens assembly of the selected dome;

30 (iv) a video management video controller for receiving video signals from the selected camera and lens assembly of the selected dome and controlling sending of the video signals;

(v) a video management video switcher for
35 receiving the controlled video signals of the selected camera and lens assembly from the video management video controller;

(vi) a video management video transmitter for transmitting the video signals from the video management

video switcher to the apparatus receiving means to permit monitoring of a plurality of remote locations relative the selected dome and to permit viewing of controlling of the functioning of the selected camera and lens assembly.

5 11. A video surveillance system in accordance with claim 10, wherein:

 said inputting means comprises an apparatus controller for inputting the instructions and generating the camera adjustment signals for controlling the functioning of the
10 camera and lens assembly, the functioning of the camera and lens assembly including panning and tilting, focusing, zooming and iris controlling of the camera and lens assembly,

 said transmitting means comprises:

 a modem for modulating the generated camera
15 adjustment signals from the apparatus controller and for forming modulated signals, and

 an apparatus transceiver for transmitting the modulated signals by wireless communication to the video management transceiving means for controlling the dome
20 controller of the selected dome to control the functioning of the camera and lens assembly and for receiving response signals from the video management transceiver responsive to the transmitted modulated signals,

 said receiving means comprises an apparatus receiver for
25 receiving the video signals from the camera and lens assembly of the selected dome by wireless communication transmitted by the dome video transmitter,

 said viewing means comprises a television for viewing the video images from the video signals generated by the
30 camera and lens assembly of the selected dome, and

 said video management transceiving means comprising:

 a video management transceiver for receiving the modulated signals from the apparatus transceiver by wireless communication and sending the response signals back to the
35 apparatus transceiver in response to the received modulated signals from the apparatus transceiver, and

 a modem for demodulating the received modulated signals from the video management transceiver and sending the

demodulated signals to the dome video controller for controlling the functioning of the camera and lens assembly.

12. A video surveillance system in accordance with claim 11, wherein the video signals sent by said dome video transmitter and received by said apparatus receiver are in a first channel of a radio frequency range and the signals sent by said apparatus transceiver and received by said video management transceiver and the response signals sent by said dome transceiver and received by said apparatus transceiver are in a second channel of said radio frequency range.

13. A video surveillance system in accordance with claim 12, wherein said first channel is a channel within the radio frequency range 902 to 928 MHz and said second channel is channel within the radio frequency range 902 to 928 MHz.

14. A method of video surveillance comprising the steps of:

a. generating camera adjustment signals by means of a video surveillance apparatus, the video surveillance apparatus comprising:

apparatus control means comprising:

means for inputting instructions and generating camera adjustment signals in response to the instructions input thereto; and

apparatus transmitting means for transmitting the generated camera adjustment signals by wireless communication; and

display means comprising:

apparatus receiving means for receiving video signals by wireless communication;

means for viewing video images from the received video signals;

b. transmitting the generated camera adjustment signals by means of the apparatus transmitting means to a video surveillance dome, the video surveillance dome comprising:

a camera and lens assembly for producing the video images and generating the video signals from the video images;

a dome controller connected to the camera and lens assembly for controlling functioning of the camera and lens assembly;

5 a dome transceiving means for receiving the generated camera adjustment signals from the apparatus transmitting means and for providing the received signals to the dome controller to control the functioning of the camera and lens assembly;

10 a dome transmitter for transmitting the video signals generated by the camera and lens assembly to the apparatus receiving means;

c. receiving the camera adjustment signals by means of the dome transceiving means;

15 d. controlling the functioning of the camera and lens assembly by means of the camera adjustment signals received by dome controller from the dome transceiving means and being capable of receiving the signals from a plurality of remote locations from the dome and transmitting the camera adjustment signals from a plurality of remote locations from
20 the apparatus to the dome;

e. generating the video signals from the video images produced by the camera and lens assembly;

f. transmitting the video signals by means of the dome transmitter; and

25 g. receiving the video signals at the video surveillance apparatus by means of the apparatus receiving means and being capable of receiving the video signals from a plurality of remote locations from the dome and transmitting the camera adjustment signals from a plurality
30 of remote locations from the apparatus to the dome.

15. A method in accordance with claim 14, wherein:

said inputting means comprises an apparatus controller for inputting the instructions and generating the camera adjustment signals for controlling the functioning of the
35 camera and lens assembly, the functioning of the camera and lens assembly including panning and tilting, focusing, zooming and iris controlling of the camera and lens assembly,

said apparatus transmitting means comprises:

a modem for modulating the generated camera adjustment signals from the apparatus controller and for forming modulated signals, and

an apparatus transceiver for transmitting the
5 modulated signals by wireless communication to the dome transceiver for controlling the dome controller to control the functioning of the camera and lens assembly and for receiving response signals from the dome transceiving means responsive to the transmitted modulated signals,

10 said receiving means comprises an apparatus receiver for receiving the video signals from the camera and lens assembly by wireless communication transmitted by the dome transmitter,

said viewing means comprises a television for viewing
15 the video images from the video signals generated by the camera and lens assembly, and

said dome transceiving means comprising:

a dome transceiver for receiving the modulated
signals from the apparatus transceiver by wireless
20 communication and sending the response signals back to the apparatus transceiver in response to the received modulated signals from the apparatus transceiver, and

a modem for demodulating the received modulated
signals from the dome transceiver and sending the demodulated
25 signals to the dome controller for controlling the functioning of the camera and lens assembly.

16. A video surveillance system in accordance with
claim 15, wherein the video signals transmitted by said dome
transmitter and received by said apparatus receiver are in a
30 first channel of a radio frequency range and the signals sent by said apparatus transceiver and received by said dome transceiver and the response signals sent by said dome transceiver and received by said apparatus transceiver are in a second channel of said radio frequency range.

35 17. A video surveillance system in accordance with claim 16, wherein said first channel is a channel within the radio frequency range 902 to 928 MHz and said second channel is a channel within the radio frequency range 902 to 928 MHz.

18. A method of video surveillance comprising the steps of:

a. generating camera adjustment signals by means of a video surveillance apparatus, the video surveillance apparatus comprising:

apparatus control means comprising:

means for inputting instructions and generating camera adjustment signals in response to the instructions input to the apparatus control means; and

apparatus transmitting means for transmitting the generated camera adjustment signals by wireless communication; and

display means comprising:

apparatus receiving means for receiving video signals by wireless communication;

means for viewing video images from the received video signals;

b. transmitting the generated camera adjustment signals by means of the apparatus transmitting means to a video management system, the video management system comprising:

(i) video management transceiving means for receiving the generated camera adjustment signals from the apparatus transmitting means;

(ii) a video management controller for receiving the generated camera adjustment signals from the video management transceiving means and for controlling sending of the signals to a selected dome;

(iii) a video management switcher for switching between a plurality of domes and sending the signals from the video management controller to a selected dome to control a selected dome controller of the selected dome for controlling functioning of a selected camera and lens assembly of the selected dome;

(iv) a video management video controller for receiving video signals from the selected camera and lens assembly of the selected dome and controlling sending of the video signals;

(v) a video management video switcher for switching between the plurality of dome and for receiving the controlled video signals of the selected camera and lens assembly from the video management video controller; and

5 (vi) a video management video transmitter for transmitting the video signals from the video management video switcher to the apparatus receiving means;

c. receiving the camera adjustment signals by means of the video management transceiving means;

10 d. controlling the functioning of the selected camera and lens assembly by means of the camera adjustment signals received by video management controller from the video management transceiving means and being capable of receiving the signals from a plurality of remote locations
15 from the video management system and transmitting the camera adjustment signals from a plurality of remote locations from the apparatus to the video management system;

e. generating the video signals from the video images produced by the selected camera and lens assembly;

20 f. transmitting the video signals by means of the video management video transmitter; and

g. receiving the video signals at the video surveillance apparatus by means of the apparatus receiving means and being capable of receiving the video signals from
25 a plurality of remote locations from the video management system and transmitting the camera adjustment signals from a plurality of remote locations from the apparatus to the video management system.

19. A method in accordance with claim 18, wherein:

30 said inputting means comprises an apparatus controller for inputting the instructions and generating the camera adjustment signals for controlling the functioning of the camera and lens assembly, the functioning of the camera and lens assembly including panning and tilting, focusing,
35 zooming and iris controlling of the camera and lens assembly,

said transmitting means comprises:

a modem for modulating the generated camera adjustment signals from the apparatus controller and for

forming modulated signals, and

an apparatus transceiver for transmitting the modulated signals by wireless communication to the video management transceiving means for controlling the dome controller of the selected dome to control the functioning of the camera and lens assembly and for receiving response signals from the video management transceiver responsive to the transmitted modulated signals,

said receiving means comprises an apparatus receiver for receiving the video signals from the camera and lens assembly of the selected dome by wireless communication transmitted by the dome video transmitter,

said viewing means comprises a television for viewing the video images from the video signals generated by the camera and lens assembly of the selected dome, and

said video management transceiving means comprising:

a video management transceiver for receiving the modulated signals from the apparatus transceiver by wireless communication and sending the response signals back to the apparatus transceiver in response to the received modulated signals from the apparatus transceiver, and

a video management modem for demodulating the received modulated signals from the video management transceiver and sending the demodulated signals to the video management controller for controlling the functioning of the selected camera and lens assembly.

20. A video surveillance system in accordance with claim 19, wherein the video signals transmitted by said video management transmitter and received by said apparatus receiver are in a first channel of a radio frequency range and the signals sent by said apparatus transceiver and received by said video management transceiver and the response signals sent by said dome transceiver and received by said apparatus transceiver are in a second channel of said radio frequency range.

21. A video surveillance system in accordance with claim 20, wherein said first channel is a channel within the radio frequency range 902 to 928 MHz and said second channel

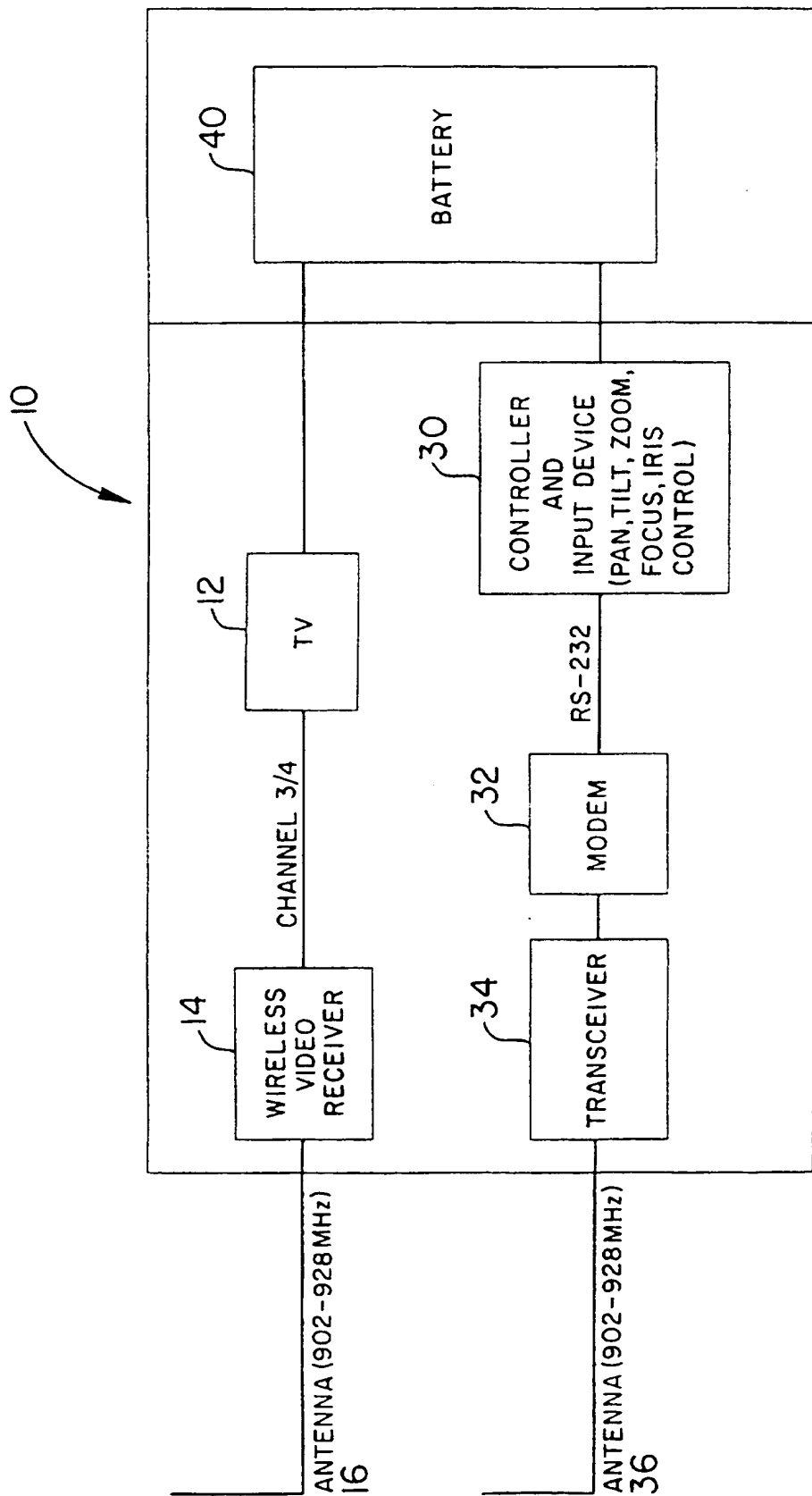


FIG. 1

2/5

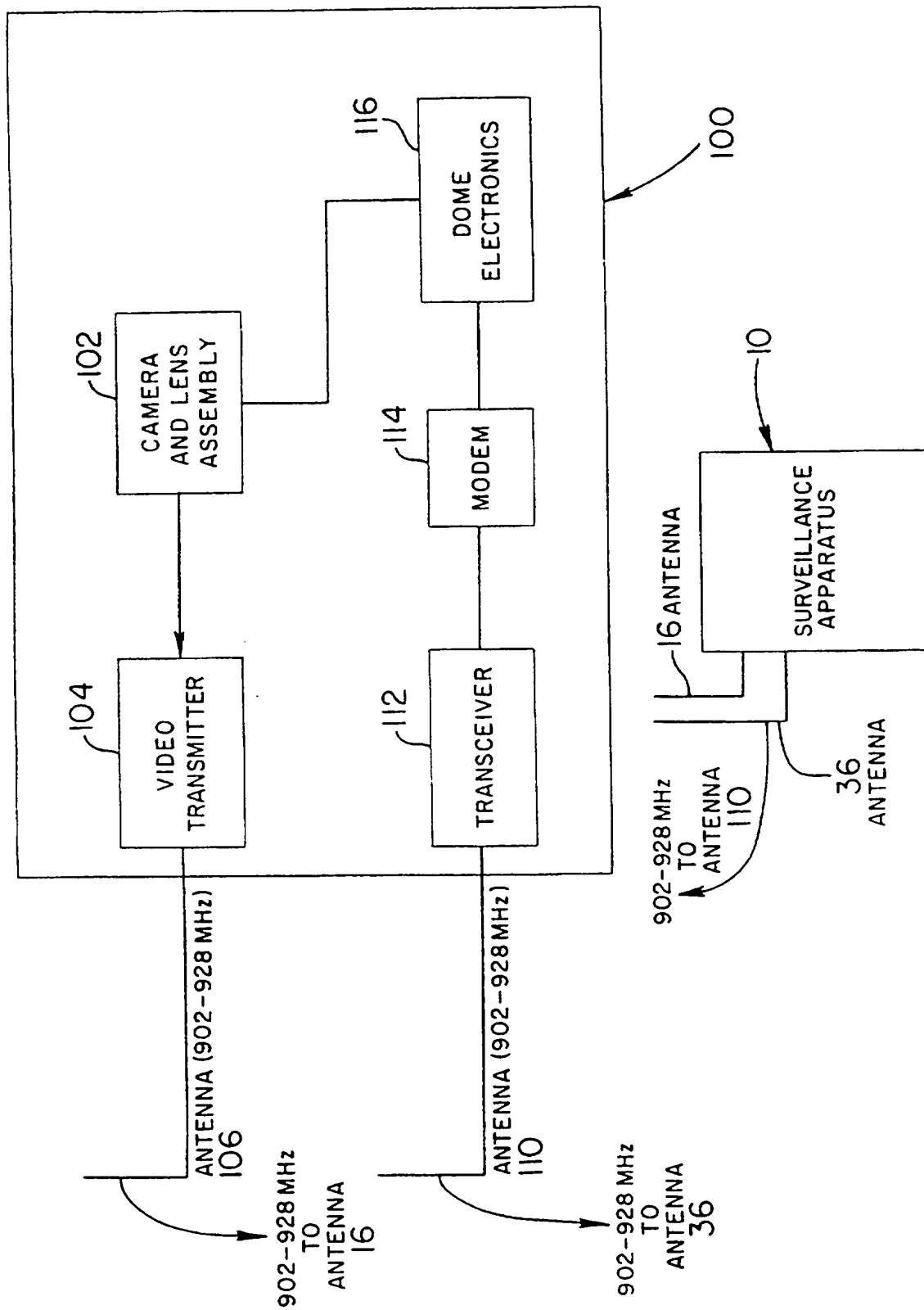


FIG. 2

3/5

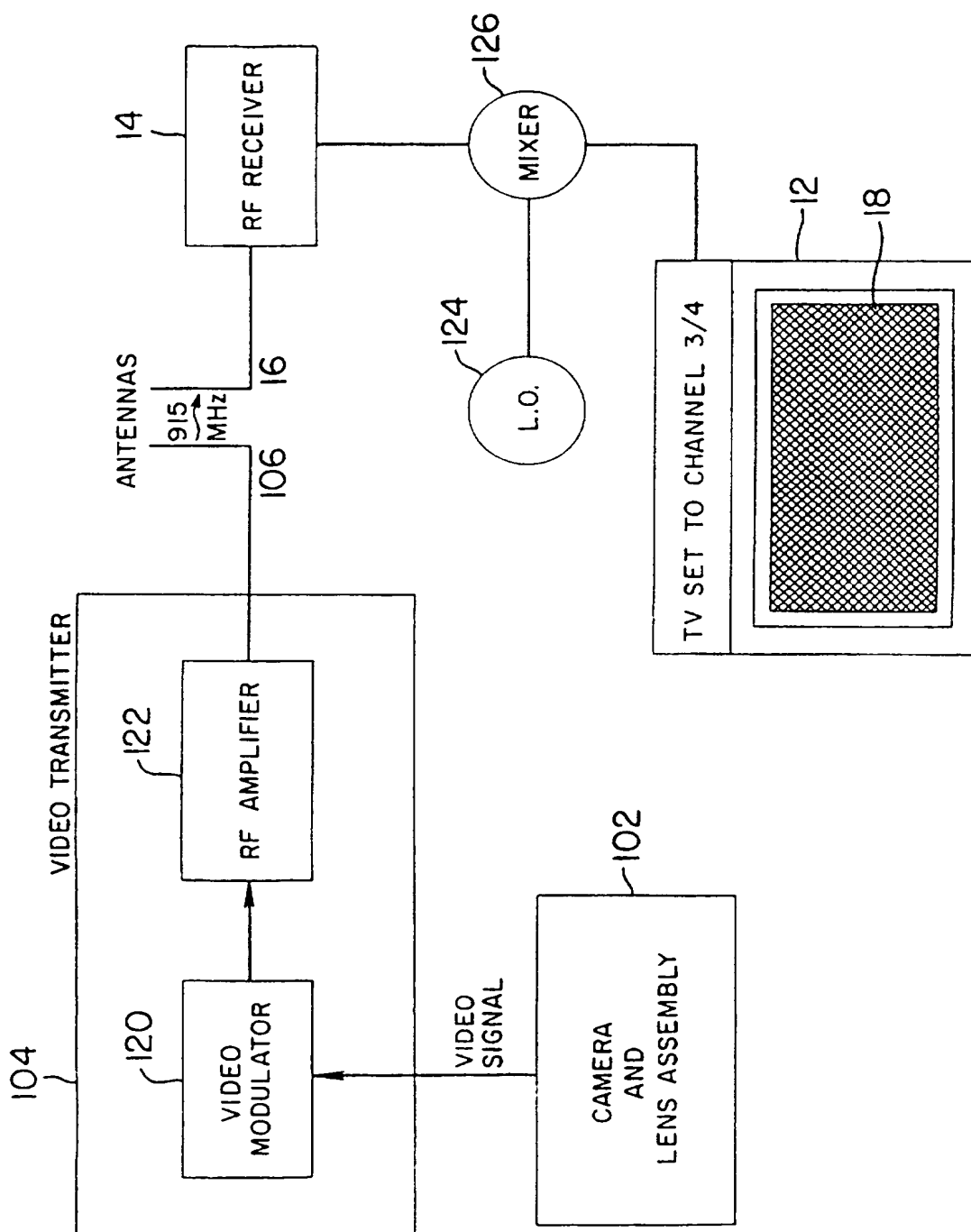


FIG. 3

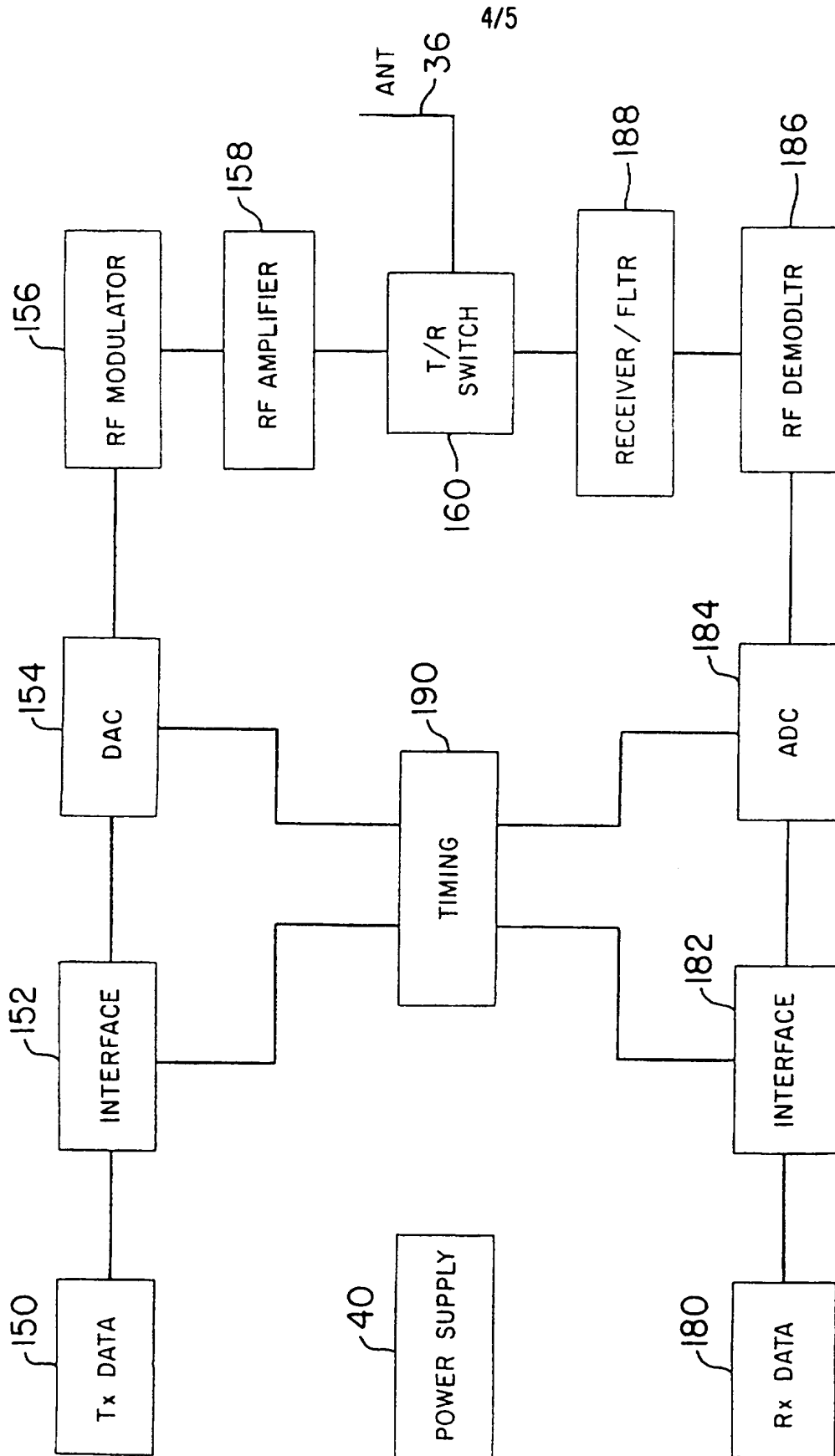


FIG. 4

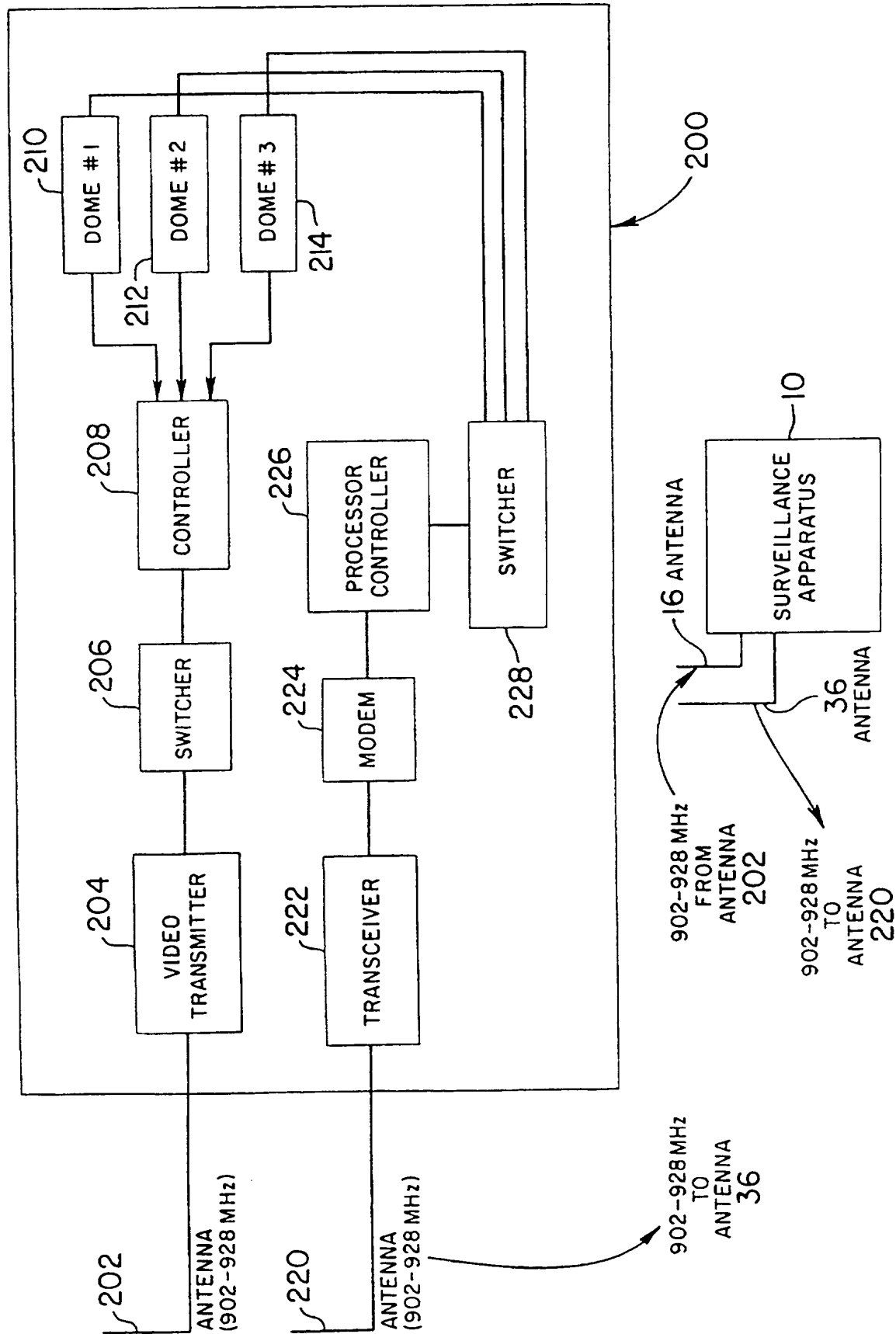


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US96/18683

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :H04N 7/18

US CL :348/143

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. 348/143, 144, 149, 150, 151, 152, 153, 158, 159

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4,510,526 A (COUTTA ET AL) 09 APRIL 1985, FIGS. 11-12; COL. 5, LINES 33, 48, 50-55; COL. 6, LINES 1-28, 47-48.	1-3, 6-8, 10-12, 14-16, 18-20
Y	US 5,382,943 A (TANAKA) 17 JANUARY 1995, FIGS. 1-4; COL. 2, LINES 6-48; COL. 3, LINES 51-53; COL. 4, LINE 42; COL. 5, LINES 28-47, 55-66; COL. 6, LINES 40-62.	1-3, 6-8, 10-12, 14-16, 18-20
Y	US 5,128,755 A (FANCHER) 07 JULY 1992, FIGS. 1-5; COL. 1, LINES 10-11, 22-24, 61-65; COL. 3, LINES 15-16, 35-40, 50-59; COL. 4, LINES 1-13, 40.	1-21
A, P	US 5,546,072 A (CREUSEREMEE ET AL) 13 AUGUST 1996, FIGS. 1-2; COL. 2, LINES 1-10, 54-65.	1-21

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents	* Y* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
* A* document defining the general state of the art which is not considered to be of particular relevance	* X* document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
* I* earlier document published on or after the international filing date	* Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
* L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	* &* document member of the same patent family
* O* document referring to an oral disclosure, use, exhibition or other means	
* P* document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

17 JANUARY 1997

Date of mailing of the international search report

03 MAR 1997

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US96/18683

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,272,525 A (BORCHARDT ET AL) 21 DECEMBER 1993, COL. 1, LINES 54-68; COL. 2, LINES 1-48.	4, 9, 13, 17, 21
A	US 5,111,290 A (GUTIERREZ) 05 MAY 1992, COL. 4, LINES 26-60.	1-21
A	US 4,325,079 A (LITTLE) 13 APRIL 1982, FIG. 1; COL. 3, LINES 48-68.	1-21
A	US 5,111,288 A (BLACKSHEAR) 05 MAY 1992, FIGS. 1, 3; COL. 3, LINES 8-36.	1-21
A	US 5,144,661 A (SHAMOSH ET AL) 01 SEPTEMBER 1992, FIG. 1; ABSTRACT.	1-21
A	US 5,406,324 A (ROTH) 11 APRIL 1995, FIG. 1; COL. 3, LINES 55-68.	1-21
A	US 4,670,739 A (KELLY, JR.) 02 JUNE 1987, FIG. 5; COL. 2, LINES 3-54.	1-21

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